

ALPHAMIX™ REVIEW

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AlphaMix™

The PSC AlphaMix is the latest edition to the PSC line of mixers. This ENG/EFP¹ style mixer is relatively small (approx. 10”X7”X2”; 4.25 lbs/1.9Kg) for the amount of flexibility it offers. One of the first features you notice on the AlphaMix is the ability to power the mixer from an **internally housed NP-1**. The NP-1, a format common to ENG/EFP video cameras, is a high capacity rechargeable battery. If no microphones are being powered, the AlphaMix consumes only 210mA of current which translates to a 10 – 15 hour battery life². If the operator prefers they can opt to use 10x AA Alkaline batteries instead which supply the standard 4 – 7 hours of operating time. Nevertheless, the NP-1 compatible design is hard to beat.



Photo Courtesy PSC

Many ENG/EFP professionals use the NP-1 to externally power other mixers. The difference with the AlphaMix is that the battery inserts directly into the unit. Typically an operator would have to supply a specialized adapter and carry the battery separately from the mixer. While this is not overly impractical, PSC has had the insight to recognize the demand for the NP-1 format and employ the convenience of housing long-life rechargeable batteries.

¹ The clarity of this mixer opens its application to location sound feature film work as well. Use of the expansion port for a forthcoming two additional channels.

² Battery life with all mixers is dependent upon the number of devices that are drawing current from the battery. If several powered microphones or wireless receivers are in use, the battery life will be reduced. It is also important to realize that battery life varies significantly dependent upon the type of NP-1 used including: Ni-Cad, nickel Metal Hydride and Lithium-Ion.

Input Side Panel

The input section of the AlphaMix is truly impressive for the price. This 4-channel mixer begins with standard female XLR balanced inputs. PSC has developed an **ultra low noise input circuitry**³ in an effort to set new standards in field production equipment. These inputs can be used at mic or line level and have an input range from -70dBu to +4dBu. A toggle switch beneath each XLR input provide two level setting: “M” for Microphone at 0dB attenuation; and “L” for line at 50dB attenuation.



Photo courtesy PSC

Microphone powering switches are also located below the XLR connectors and provide standard Dynamic (D), Tornader 12-volt (T-series/AB) and 48-volt phantom powering. The provision for T-series phantom powering is a welcomed return to this common format for PSC. While T-series was available on the M4A+ it was not offered on the MKm4II. As should always be the practice, the appropriate phantom power should be used for each mic. When using line level, dynamic mics or wireless receivers, the Dynamic (DYN) setting should be selected as no voltage is applied.

Another milestone for PSC is featured just above input Channel 1. Introduced with the M4mkII, the AlphaMix offers a **remote control of the boom audio level**. This affects Channel 1 only and offers the operator the capability of riding the level of the boom input via a remote that can be mounted on the boom pole. This feature is very useful when attempting to mix and boom simultaneously. Although not recommended, this scenario is a common occurrence with ENG. It is quite difficult to boom with one hand and mix with the other. The weight of the boom mic makes this practice a challenging task. Typically, boom placement is compromised when the stabilizing hand is removed to manipulate the mix. To overcome this limitation, PSC has had the foresight to design a fader remote control that will strap directly on to the boom pole⁴. This control allows an input control range of about 25dB. An LED on the front panel indicates that the remote control is engaged which overrides the channel gain trim pot while in use.

³ 1nV per root of the Hz.

⁴ Setup directions are in the front panel gain control section, page (#).

Although this is the input side of the mixer numerous outputs are located here as well. The AlphaMix offers individual **balanced outputs for each of the four channels**. This feature, rare in ENG mixers, is extremely useful for isolating the output of each channel. Multiple microphone input mixing to mono or stereo output typically raises the noise floor to unacceptable levels. In addition, mixing of signals renders absolute isolation of each signal in post-production impossible. PSC has overcome this obstacle by providing individual balanced outputs for each channel. With this flexibility, the operator can send isolated channel program content to dedicated inputs on a single camera/VTR or to multiple record units.

The **monitor output** (headphone) is located just to the right of XLR input for Channel 4. This is a standard 1/4" stereo headphone jack. The headphone amplifier circuitry will drive most headphones within range of 32 – 600 Ohms impedance. The headphone attenuator, monitor select rotary knob and source toggle are located on the front panel.

Front Panel

Experienced manufacturing becomes obvious when looking at the front panel of the AlphaMix. The sleek design of this mixer is the result of years of design refinements. **Retractable channel gain, pan pot and headphone level controls** greatly improve operation; preventing unintended changes in the settings while in use. When needed, these controls will pop up for access. The chassis features shields on either side of the mixer protruding sufficiently to protect the mixer controls. The rigid aircraft aluminum formed chassis provides significant resistance to torque. Housing parts are plated to resist corrosion, and epoxy power coated for durability. All labeling is silk-screened underneath a hard-face overlay that renders the labels virtually wear proof. The advantage to this is readily obvious to operators who have faced the challenge of using mixers with worn off faceplate labels.

All AlphaMix photos courtesy PSC

PSC has significantly improved the **gain structure** of the M4 series mixer with the AlphaMix. The addition of retractable gain trims on each channel allows continuously variable control of the input gain over a 40dB range. The signal flows from the preamplifier to the low cut filters and then to the channel fader amplifier. Each channel fader is in the feedback loop of the fader amplifier and thus controls the gain of the amplifier rather than just serving as a rotary attenuator of the signal (standard volume control). The AlphaMix is not equipped with a Master Fader. Research revealed that less than 1% of the customers were using the master fader. By eliminating this non-essential control, PSC was able to free up space for additional features⁵.

This gain structure, rare with mixers of this class, is additionally enhanced by the presence of **input channel metering**. The green, yellow and red LEDs indicate pre-fader audio level enabling the operator to preset channel gain levels prior to opening up

⁵ Ron Meyer, President, PSC.

the attenuator. These LEDs are calibrated to reflect audio levels of -20dBu (green), 6dBu (yellow) and 0dBu (red). To properly set the input gain trim, the red LED should just flash at the transient peaks of signal. For dialog, the green LED should remain lit with occasional yellow presence at the peaks. Continuous red indicators are representative of potential signal overload. These levels also indicate the output gain level of the individual balanced outputs on the input side panel.



Just to the right of each gain control are the AlphaMix **retracting pan pots**. These are equipped with center detents to confirm mid placement in the summing output bus. As with any pan pots; the signal may be positioned as desired within the stereo field. Once placement has been determined the pots can be recessed to keep the front panel free from obstruction while mixing.

The **PFL** button in the lower left corner is yet another feature uncommon to mixers in this class. PFL allows the operator to monitor the signal prior to the Channel Gain. This capability is critical in determining the quality of the incoming signal. It may also be utilized when setting the Gain Trim level from an auditory context.

In the bottom right corner of each channel is the **active low cut/high pass filter**. This three-position switch allows a 12dB per octave attenuation of all frequencies below the preset frequency. The preset frequencies are at 80Hz (left position), 20Hz (center position) and 140Hz (right position). If the 80Hz low cut is selected, there will be an initial -3dB roll off at 80Hz. All frequencies below 80Hz will be rolled off at 12dB per octave. The same applies to the 140Hz low cut application. When set at the middle or “20Hz” position frequencies below 20Hz are rolled off with the AlphaMix operating at full frequency response.

Centered below the Channel Gain⁶ is the **Remote Control indicator LED**. This will illuminate in the event that the remote control on the boom is employed indicating its use. It is important to note that the use of the remote control overrides the channel gain input trim pot. To properly utilize the remote control the following steps should be observed:

1. Set mixer up as normal with appropriate microphone power and channel fader off.
2. Attach remote control to the boom pole with strap.
3. Plug remote connector into mixer.⁷
4. Set slide fader to middle position and reopen channel fader until meters register a normal signal.
5. Sliding knob toward the end of the cable lowers the volume.
6. Sliding knob away from the cable end increases the volume.

*AlphaMix
remote
control
setup
procedure.*

⁶ Remote control featured on channel 1 only.

⁷ See “Input Side Panel” photo page (#)

The boom remote offers a control range of approximately 25dB. Caution must be observed before removing the remote control as high audio levels may occur should the channel fader be anywhere near maximum level.

Viewing meter levels on the AlphaMix is very easy due to the large LCD meter readout. PSC has designed these **peak-reading meters** to emulate those of the Betacam. The LCD meter provides additional information such as Left and Right Limiter functions, battery life and Low Battery Warning. The operator has approximately 15 – 30 minutes of remaining battery life when the “Low Bat” indicator illuminates. In poor visibility and night viewing situations meter lamps are available. PSC chose a woven fiber optic light transmission panel with a high performance “green” LED as a light source rather than an electro-luminescent system. The combined approaches yield quality backlighting without introducing noise. To activate the lamps there is a toggle switch located below the bottom right corner of the meter.



Directly below the meters you will find the **Slate Microphone (SLATE MIC)** button. When this momentary push button is depressed the slate microphone is activated. The electret variable gain microphone is located just to the left of the button. A really nice function of this switch is that it automatically mutes the input channels. This eliminates the need to pot down the input channels in order to eliminate unwanted audio. The hidden benefit is that potting down the inputs effectively destroys any mix the operator may have previously established. Such practice will waste valuable time and render continuity virtually impossible. A trim pot is located on the bottom panel for level adjustment of the Slate Mic.

To the right of the Slate Mic is the **Tone Oscillator (TONE OSC)**. PSC chose a reference frequency of 440Hz rather than the more common 1kHz. The rationale behind this was that the 1kHz tone was particularly harsh to the ears. More often than not, tone is turned on while someone is auditioning the mixer. While this is probably unintentional it can be very irritating to be hit with a 1kHz tone at 0dB. Since all that is required to calibrate the various metering systems in the chain is a pure tone, the frequency is not particularly relevant. A trim pot is located on the bottom panel for level adjustment of the tone oscillator.

Next in line with the Tone Osc is the **Battery Test (BATT TEST)** button. Depressing this momentary button causes the top (left) meter to display the remaining life expectancy of the battery. The length of the bar is directly proportional to the life of the battery. A full bar would indicate a full battery, a half-bar suggests a half-full battery and so forth. NP-1 batteries are available in a number of formats⁸. Therein, PSC has installed a selector on the bottom panel of the AlphaMix that will adjust the function of the battery test feature specific to the NP-1 type.

⁸ Ni-Cad, Nickel Metal Hydride and Lithium-Ion.

To the left of the Lamps switch is the **Output Limiter (LIM)** three-position switch. The setting of this switch (Off, “S” separate, or “G” ganged) determines the limiting function. Two independent and separate limiters are built into the AlphaMix; particularly useful when recording split tracks. This allows one limiter to engage when the limit threshold (+3 on the meter) is reached. If the other channel remains below threshold it will not engage. The compression ratio of the limiter is approximately 2.7 to 1 with a 1mS attack time and 100mS release. The presence of output limiting is displayed on the meter. PSC recommends use of the limiters at all times when recording to Betacam type cameras.

The last switch on the lower left of the front panel is the **Power (PWR)** switch. This two-position switch selects the power source. The AlphaMix can be powered from an internal battery (IN) or an external source (EXT).

Headphone output function controls are located on the upper right corner directly above the LIM switch. These controls consist of a recessing output volume (HP VOLUME) pot, a source toggle switch (HP) and a rotary mix select switch. The headphone circuitry of the AlphaMix will drive most any headphone with impedance of 32 to 600 Ohms.



After setting the desired headphone level, the rotary **HP VOLUME** pot can be recessed to prevent accidental changes. To the right of the volume pot is the three-position **source toggle switch** (labeled **HP**). This switch enables the operator to monitor the AlphaMix’s tape returns. Tape returns arrive through the Hirose™ 10-pin connectors on the Output Panel. In the center “D” position the operator is able to monitor the mixer directly. Positions “A” and “B” monitor camera/recorder returns. “A” and “B” levels can be adjusted to match the signal levels of most any device using a small jeweler’s screwdriver. Levels are adjusted on the bottom panel. Below the HP VOLUME pot is the **mix selector** (not labeled). This 5-position rotary switch determines the monitoring of Left only (L), Stereo L/R (S), Right only (R), mono (M) or Mid Side Stereo (MS).

When **recording stereo X-Y or M-S signals** the headphone mix selector should be set in the Stereo or MS position respectively. Additionally, the input-ganging switch located on the bottom of the mixer must be set to the “ganged” position. This allows the inputs of channels 3 and 4 to be ganged enabling both channels to be controlled by pot 4. With either type of stereo mixing, the pan pots for channels 3 and 4 remain independent and should be panned hard L (3) and R (4). When recording X-Y stereo; identical microphones are plugged into channels 3 and 4. M-S stereo recording requires that the middle “M” microphone (cardioid) is plugged into channel 3 and the “S” side microphone (bi-directional) be plugged into channel 4. The headphone amplifiers receive MS decoded signals that appear as standard stereo audio for monitoring without affecting the main XLR outputs.

Output Panel



PSC has really put some thought in the output capabilities of the AlphaMix. It is remarkable that the output section of this mixer supplies 3 balanced stereo outputs, 2 TRS stereo outputs and 1 mono output in addition to the 4 direct outputs on the

Input Panel. The AlphaMix features dual isolated audio output transformers designed to supply wide bandwidth and low distortion and interface with virtually any other device including wireless transmitters. Furthermore, the dual transformers allow operator to feed two cameras without interference.

Centered on the output panel are two 10 pin Hirose™ camera connectors. This connector supplies balanced outputs for both left and right channels and provides tape monitor returns. **CAMERA A** sends the same information as the L/R XLR outputs located to the right of the Hirose connectors. **Toggle switches** below the XLR outputs determine whether the signals for the XLR's and CAMERA are at line level (+0dBv into 10k Ohm⁹ loads) or mic level (-50dBv). **CAMERA B** is isolated electronically from CAMERA A and is independently switched to line or mic level via the toggle switch located below the output.

The **AUXILIARY OUTPUTS** located above the right main XLR output are intended for transcription. Both outputs are stereo 3.5mm TRS connectors wired: Tip = Left, Ring = Right and Sleeve = Ground. These switchable outputs are located on the top panel near the right side, just above the AUX OUT connectors. They will supply either line level at -10dBv or mic level at -50dBv. If desired, the XLRs themselves could be used in place of or in conjunction with the stereo mini-jack for DAT or audio tape recording.

In the upper left corner PSC has installed two multi-pin mini-jacks outputs. The 3-pin jack supplies a balanced **mono feed (labeled OUT)**. This is quite useful in sending a wireless IFB feed to a producer, teleprompter or boom operator. Adjacent to the mono feed is a 5-pin **GANG** output. This is an expansion port for future PSC accessories including a soon to be released 2 channel expansion module that will increase the input capability of the AlphaMix to 6.

The upper right corner features 4 **auxiliary power outputs (AUX PWR OUT)** to power wireless transmitters. An ENG/EFP audio package typically includes 4 such

⁹ The typical load imposed by most Betacams and other devices is 10K Ohms.

transmitters that have traditionally required specialized adapters that attach to external batteries. PSC has effectively eliminated the need for this additional hardware with these auxiliary power supplies. The NP-1 battery receptacle is located in the bottom right corner. This receptacle will also accept 10 AA alkaline batteries housed in a battery tray designed to be inserted into the NP-1 battery slot. PSC does not recommend that alkaline batteries be used when powering wireless receivers; however, as they will not deliver enough power to simultaneously operate the mixer and the receivers. External power supplies can be introduced through the Hirose™ 4-pin plug located in the lower right corner. The pin configuration of this connector is Pin 4 (+, positive) and Pin 1 (-, negative) and accepts DC power from 10 – 18 Vdc. This DC input is protected from reverse polarity so that the mixer will not be damaged from inadvertent polarity mismatch. In the event of reverse polarity the mixer will simply not power up.

Conclusion

PSC has set numerous benchmarks with the AlphaMix ensuring that it will be a dominant force among ENG/EFP mixers in its class. The ergonomic design allows ease of operation and accessibility to all critical switches from the outside of the mixer. A small number of switches are located on the bottom of the mixer; however, the need to adjust these controls is rare. In the event that they do need adjustment they can be easily accessed by slipping the mixer out of its carrying case. Numerous PSC exclusives have been unveiled with this versatile mixer that set it apart from other mixers in its class including:

1. Very low noise preamplifiers.
2. 3 LED meters on each input channel.
3. Remote control slide fader that boom mounts.
4. Dual Hirose™ 10 pin connectors for multi-camera feed.
5. Balance mono output.
6. Internal NP-1 receptacle
7. Built-in and calibration switchable battery monitor.
8. Custom LCD peak meters that emulate Camcorders.
9. Wear-proof subsurface silk-screening.